

The Dilemma of Tainted Blood

The Washington Post

August 1, 1971

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"GIVING BLOOD SAVES LIVES"
G was one of the last commemorative appeals of the old U.S. Post Office Department. Its purpose was to encourage more generosity from 100 million potential donors of blood who contribute to an already deteriorating and disorganized system of collection by staying home.

We cannot easily tell whether such an appeal has had any effect, for lack of comprehensive national statistics. Richard M. Titmuss, in "The Gift Relationship," guesses that about 8 million pints are collected yearly, and some 2 million of these are unaccounted for. How many of these were wasted, how many were utilized in unreported transfusions is not known. As every potential donor is a potential donee, we all have a stake in the integrity and efficiency of the system. Transfusions of blood undoubtedly save hundreds of thousands of lives each year; and no reliable substitute is known for many of its uses.

But blood is sometimes a treacherous gift, for at least 3,000 patients die each year, not from their primary disease or injury, but from hepatitis derived by transfusion of infected blood. According to J. G. Allen, professor of surgery at Stanford, transfusion hepatitis is grossly underreported and the hazard may be much greater. Generally about 1 per cent of patients who have received blood transfusions undergo a risk of jaundice and liver disease which may not appear until several months later. Dr. Allen has argued for many years that the main burden of this risk stems from the use of "commercial blood," as opposed to that from voluntary donors. In recent years these claims have been substantiated on the basis of new knowledge of the hepatitis virus.

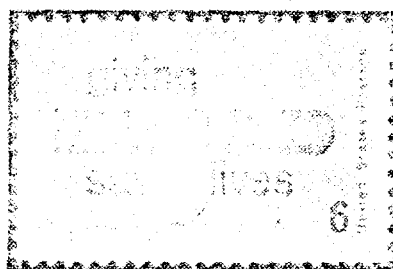
The Australia Antigen

IT IS HARD TO IMAGINE a more esoteric, seemingly more useless line of research than the study of new blood factors in Australian aborigines and Peruvian Indians. This sort of game might inspire congressmen and presidents to demand that scientists stop playing in the laboratory—or

field-tripping around the world—and get down to the real business of delivering results, quickly, for the health of the multitude. Geneticist Baruch S. Blumberg, of Philadelphia's Institute of Cancer Research, could not have known that his studies of blood factor genetics among tropical peoples would soon illuminate a vital problem affecting many lives and exposing many dilemmas of ethics and policy.

In 1964 Dr. Blumberg described what appeared to be another genetic marker, analogous to the familiar blood types. However, this one, the Australia antigen, was a characteristic of the blood serum, rather than of the red cells, of a small proportion of the people tested. Its first detection depended on the serendipitous discovery of an antibody reacting with the Australia antigen in one particular serum. This was in a patient who had received repeated transfusions as a treatment for hemophilia.

In further studies Blumberg found that this new factor occurred quite



rarely (less than 1 per cent) in most populations throughout the world. Australian aborigines and inhabitants of the South Sea Islands all ran around 5 per cent. The factor reached a level of 9.5 per cent in Ghana, 13 per cent among Taiwanese—and 20 per cent among an isolated tribe of Cashinahua Indians in Peru.

Family studies in areas where the Australia antigen was prevalent indicated that the factor was inherited in simple genetic fashion. Unlike most blood factors, however, it was found only in individuals who received the gene from both parents.

Eventually the antigen was also found in Europeans and Americans, but only very rarely, and then often in association with leukemia, or with the chromosome-anomaly disease, Down's syndrome. This bewildering set of correlations made little scientific sense

until Blumberg and a number of other investigators finally verified that the Australia antigen was frequently associated with a history of hepatitis.

A Disease of Civilization

AT THE PRESENT TIME most workers believe that the Australia antigen—or HAA as it is now called, for hepatitis-associated-antigen—consists of actual virus particles and their skins. These particles have not yet been firmly identified as a virus, for we lack a reliable laboratory animal or cell culture systems in which to cultivate them or demonstrate their infectivity. However, the particles have already been reported to contain an enzyme similar to the RNA-DNA system which was one of last year's most exciting discoveries in the field of virus biochemistry.

How does HAA, presumably a virus, relate to the genetic factor originally postulated by Blumberg? We cannot close our minds to the idea that a gene may be liberated and behave like a virus, or vice versa. However, the most likely explanation is that this particular gene marks those individuals who are most susceptible to this virus and who, once infected, retain it in their blood for a long time. In tropical environments the virus is assumed to be so prevalent that everyone will be exposed to it. As with many other viruses, children infected with it may show little disease, but they would acquire a life-long immunity. And some of them may also be long-term carriers.

Elsewhere, improved hygiene makes the disease much rarer; but when it does occur in adults it may have much more severe consequences. In this sense, lethal hepatitis, like polio and smallpox, is another disease of civilization. Other studies support the view that high levels of HAA in the blood are correlated with very mild, even imperceptible, disease, and vice versa.

This may be a sufficient explanation for the lethal risk associated with commercial blood. People who earn a living by selling their blood are likely to have grown up in less hygienic environments and to be asymptomatic carriers of the virus. They have, furthermore, a financial incentive to deny a history of hepatitis, even if they were aware of it, that would disqualify them as a donor.

Hepatitis is also transmitted by in-

infected needles shared among drug addicts. Commercial donors who sell blood to finance a drug habit may then also add to the risk of undetected hepatitis. We can only speculate about the relative importance of these and other factors. At any rate, several studies with the now more powerful tool afforded by the test for HAA have shown that commercial donors are at least 10 times more likely to transmit hepatitis than volunteers.

Tests Lack Precision

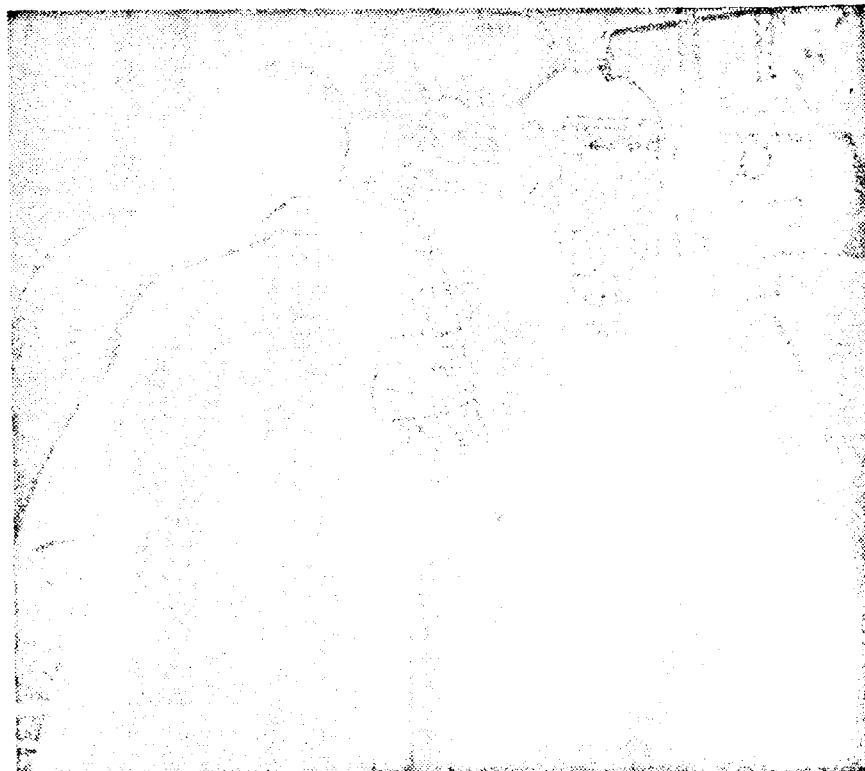
A SIMPLE SOLUTION to the problem might be to test every blood sample for HAA before transfusion. Unfortunately, in its present state of development, the test will detect only about one-third of the samples of contaminated blood. This is already a good enough reason to institute the use of HAA testing on a wide scale but obviously it only begins to solve the problem. Many blood samples, although still quite infectious, may simply contain too little of the virus to be detected by present techniques.

Furthermore, other forms of hepatitis, including the so-called "infectious hepatitis" that might be derived from contaminated seafood or water supplies, are due to a different agent than HAA. But they may still play an important role in disease after transfusion. No biological test, other than transmission to human volunteers, is known for this other agent at this time.

We surely must still try to save another 2,000 lives a year and debilitating illness for 20,000 more. But we must then rely on rather imprecise criteria for disqualifying blood from high-risk donors.

Very thorough medical examination of prospective donors, and their formal registration, would be one prospective avenue. This is precarious, for it might dry up an already inadequate supply by making the process of donation more cumbersome than many people would tolerate. The flat prohibition of cash payment for blood used for transfusion has similar perils unless we can motivate a near-doubling of voluntary donations to make up the difference. And it might force the desperate resort to a gray market that would be even more hazardous than the present one.

Our dilemmas are worsened to the



American Red Cross Photo

extent that the donor's class background is as relevant to the risk of transmitting hepatitis as any test we can ask of the individual. But until we have better tests for contamination, we can do little better than encourage the rich to donate their blood more freely than the poor, for the benefit of all.

Tax Incentive for Donors?

NEEDLESS TO SAY, the most elementary respect for social equity must make that blood equally available to all. Blood-sharing cooperatives are a partial answer to motivating donors to give low-risk blood. But can we exclude any hospitalized patient from the common supply? Will we relegate a stranger to sources that are bound to carry inherently higher risks? In the face of this overt ethical confrontation, the cooperatives will somehow have to solve the problem for the entire community, or share the remaining risks with it.

The basic problem is to encourage a wider base of voluntary donations, to undercut the treacherous commercial market in blood, and to evade the social and ethical dilemmas of allocating this particular resource, if the supply is so limited that "bad" blood must be used to fill out the need.

We have here some rationale for the proposal, supported by the National Research Council Panel of Consultants on transfusion hepatitis, and now spon-

sored by a group of congressmen, for a bill to allow income tax deductions for "voluntary" blood donations. This incentive will be relatively unattractive to the traditional type of commercial blood donor, both because he is likely to pay very little income tax anyhow and because the benefit may be deferred for many months. One can raise theoretical objections to this scheme as one can for almost any other attempt to use the income tax for purposes other than revenue. Should we not compensate the donor of a kidney or of a heart (for the benefit of his estate) many times more? Indeed, the taxpayer who wishes to donate, but is rejected for having faithfully reported a history of a disqualifying disease should get a double indemnity.

This proposal, nevertheless, has much pragmatic and even more symbolic utility. The proposal may be attacked for opening the door to a formal system of social accountability of each individual, in addition to the annual tax return. This is precisely what is being demanded today of corporations and other institutions.

Few people today have recourse to an organized framework for the invigoration of conscience. The blood sacrifice may yet return as a manifestation of the brotherhood of man. It is not alone among the religious impulses that are vital to the objective survival of the human species.